IMPROVING URBAN CONGESTION INFORMATION FOR DECISION-MAKING:

REPORT TO COAG FROM THE AUSTRALIAN TRANSPORT COUNCIL

May 2008

This report has been prepared for the Council of Australian Governments by the Standing Committee on Transport's Urban Congestion Management Working Group, under the direction of the Australian Transport Council of Ministers and the Standing Committee on Transport.

Executive Summary

In April 2007, COAG considered the Urban Congestion Review it had commissioned in February 2006, and tasked the Australian Transport Council (ATC) with establishing arrangements to improve urban congestion data, modelling and performance information for decision-making. COAG requested ATC to report on progress by June 2008. This document provides the required progress report.

Many congestion-related decisions are currently based on inadequate information. The consequences of this deficiency are substantial and will become more so as congestion levels increase over the foreseeable future. The Congestion Review concluded that unless governments ramped up their responses to urban congestion, the costs of congestion to Australia would double over 15 years, 2005-2020, to $20 billion annually. These costs represent constraints on business productivity, international competitiveness and growth; imposition of higher travel costs and lower accessibility on households; wasted fuel and higher emissions.

The Congestion Review found that there is no single 'silver bullet' solution to rising congestion pressures and that complementary measures (including both infrastructure and management-based elements) have the greatest likelihood of delivering the best long-term outcomes. Successful development of these interventions is complex and reliant on objective and rigorous analysis and information. The following major information limitations to sound decision-making on congestion interventions have been identified by transport/planning agencies:

- **Lack of consistent performance measurement within and across modes.** This is a product of the historic 'silo' mentality in transport and impedes accurate comparisons of alternative modal solutions, analysis of modal interactions and interdependencies, and analysis of approaches to improve modal integration.
- **Lack of understanding of transport movements generated by business.** Business sector movements including freight, services and people travelling on business, underpin city economies. These movements are exposed to substantial congestion pressures but are not well understood.
- **Lack of consistent multi-modal indicators.** These indicators are becoming increasingly important in urban areas to support policies introduced to shift some segments of private road-based passenger and road freight movements onto other modes.
- **Limited before and after assessments of congestion management measures.** Without such assessments it is impossible to ensure that interventions deliver their expected outcomes or to 'reality check' congestion information systems and planning assumptions.

There are initiatives already underway by individual agencies and jurisdictions, and by inter-jurisdictional modal-based groups, which will also contribute to addressing a number of these information gaps. In addition, at its meeting on 29 February 2008, ATC agreed to a new national approach to transport policy. Ministers agreed that individual Ministers from the Commonwealth, States and Territories will take responsibility for developing aspects of a national transport policy. One of the streams of work is urban congestion, which is being led by Victoria's Ministers for Roads and Ports, and for Public Transport. Subsequently, at its meeting on 2 May 2008, ATC agreed to include the further progression of the measures proposed in this report in its work plan for the urban congestion component of a new national transport policy.

The following priorities have been identified for action in developing better congestion information arrangements. Progress is being made under each priority as outlined below.

- **Performance indicators of urban systems.** A small set of core indicators that are consistent across modes (such as roads and public transport systems) have been developed under the following headline categories; efficiency, reliability, productivity, and social and environmental performance.

  Measurement for each indicator category is based on the following:

  - Efficiency: Efficiency of the system as seen by the user is measured by travel times with respect to a benchmark.
  - Reliability: Reliability is measured by the expected variation in the efficiency measure as seen by the user making the same trip on similar days.
  - Productivity: Productivity or throughput, is measured by the product of the quantity (volume) and quality (speed) of flow. A system with high productivity provides a high quality of service (indicated by higher travel speeds) to a larger number of people or goods.
  - Social: Social performance is measured by various indicators, such as travel time by mode by spatial demographic group and is closely linked with accessibility.
  - Environmental: Environmental performance is measured by fuel consumption and Greenhouse Gas emissions by mode by average number of stops and the total duration of stops on a journey.

  These indicators will facilitate comparable measurement of the main impacts of congestion, and of congestion interventions, across modes. The indicators will support accurate analysis of good performance and its drivers, and also of those factors that may contribute to lack of performance.

  The next step is to further refine and 'road-test' this set of indicators to identify important conceptual, methodological and data availability issues involved in possible implementation, including cost-effectiveness. Issues involved with development of whole-of-journey indicators, including multi-modal indicators, will also be examined. 'Road-testing' will need to involve a number of agencies across all relevant urban modes. The outcomes will provide jurisdictions with practical information to assist them in their consideration of future action.

- **Business sector urban transport movements and growth patterns.** A project is underway to better understand the transport implications of business sector growth, in order to be able to devise better strategies to minimise the impact of congestion on economic growth. Historically, the focus has been addressing the needs of larger freight vehicles. While this focus continues to be justified, the project also includes service movements (such as the rapid growth of economic functions undertaken by the service sector often involving smaller or light commercial vehicles) and business passenger travel, in order to develop better information for decision-makers.

  Next steps include undertaking specific pilot projects to identify, collect and analyse information about business-related transport, such as through use of Automated Number Plate Recognition (ANPR) technology. This particular pilot involves identifying the volume of business-registered vehicles on particular corridors, as well as times of travel, and type of business. This work will greatly assist our understanding of what business-related transport is, how it functions in Australian cities, and how congestion impacts the sector. The pilot will cover technical and data-gathering issues and would be consistent with Commonwealth, State and Territory privacy legislation and principles.

- **Urban congestion modelling.** In order to maximise the value of this tool to improving urban congestion interventions a National Workshop on Urban Transport Modelling was held in Canberra on 5 March 2008.

One of the outcomes of the workshop was to recognise that modelling is capable of informing urban congestion management interventions but that currently policy and modelling are not well coordinated. Improvements need to be made for policy makers and modellers to work collaboratively in framing appropriate urban congestion management questions.

The next step is to examine in detail the case for a possible collaborative urban modelling coordinating capability. Policy and modelling objectives could be better coordinated and areas needing most urgent action could be more easily identified. Key roles of the modelling capability could be: undertaking stocktakes of existing approaches, their strengths and limitations; developing best practice guidelines; encouraging knowledge sharing; and identifying priority data needs and strategies to address them.

- **Case studies.** Initial examination of selected current Australian congestion interventions (see Attachment for further details) has contributed useful lessons that have benefited jurisdictions. The next step will involve intensive examination and evaluation by jurisdictions of selected current and emerging interventions to provide further information on factors contributing to high value outcomes, to improve performance measurement and modelling, and uses of new technology to facilitate data collection.

Developing long-term arrangements to improve information for urban congestion decision-making is more than a conceptual data gathering exercise. Undertaking a number of evaluations, as well as 'road-testing' proposed performance indicators, will provide practical information to contribute to on-the-ground implementation of improved arrangements.

Recommendation: That COAG:

1) NOTES progress to date towards developing a national approach to improve information for urban congestion decision-making and that the Australian Transport Council will build on this progress through development of the urban congestion element of a new National Transport Policy.

1) Introduction

In April 2007, COAG considered the Urban Congestion Review it had commissioned in February 2006, and *inter alia* tasked the Australian Transport Council (ATC) with establishing arrangements to improve urban congestion data, modelling and performance information for decision-making. COAG requested ATC report on progress by June 2008. This document provides the required progress report. Work is currently underway to develop proposed improved arrangements but is not yet completed.

2) Importance of Improving Information for Urban Congestion Decision-Making

The COAG Congestion Review concluded that unless governments increased their responses to urban congestion, in terms of both scope and quality, the cost of congestion to Australia would double between 2005 and 2020. It further identified that there is no single 'silver bullet' solution to rising congestion pressures and that targeted interventions, integrating complementary measures (both infrastructure and management-based) had the greatest likelihood of delivering the best long-term outcomes. High quality information is fundamental to making better decisions about interventions, especially in complex urban areas. More informed decisions lead to better outcomes and the potential implications of poor decisions are significant. This is true for all decision-makers, whether they be governments, operators or transport users.

Forecasts undertaken on behalf of the review by the Bureau of Transport and Regional Economics (BTRE)[1], found total aggregate congestion costs for Australia's capital cities would rise from an estimated $9.39 billion in 2005 to an estimated $20.4 billion in 2020 (on the basis of potentially avoidable costs) under a business-as-usual scenario. The size and composition of these estimates are shown in Figure 1.

The estimates are based on forecasts of a likely total urban traffic increase of 37% over the forecast period. Overall, the growth in car traffic is expected to be in the order of 24% and growth of around 90% is expected for both articulated trucks and light commercial vehicles (LCVs). These projected growth rates would result in the same absolute volume of traffic being added to capital city road networks over the next 15 years as was added over the past 15 years.[2]
[3]

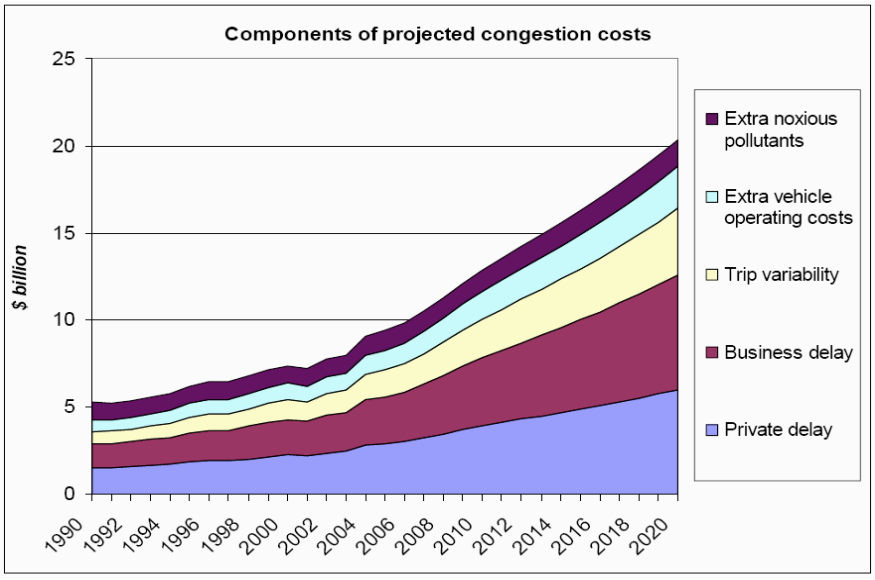

Figure 1: Composition of Projected Avoidable Costs of Congestion

The COAG Review identified the following significant impacts of rising urban congestion pressures on Australia:

[1] The Bureau of Transport and Regional Economics (BTRE) became the Bureau of Infrastructure, Transport and Regional Economics (BITRE) in January 2008.
[2] 'Estimating Urban Traffic and Congestion Cost Trends for Australian Cities,' Working Paper 71, Bureau of Transport and Regional Economics, Canberra, April 2007, p52 (BTRE, April 2007).
[3] BTRE, April 2007, p113.

- business productivity, international competitiveness and growth are negatively affected by urban bottlenecks through increased delays, unreliability and vehicle operating costs. This is exacerbated by the capital city location of our most important non-bulk ports, which are accessed by strategic urban road and rail links that serve both passenger and freight demands;
- efficiency of supply chains which transit urban areas, including for many rural and regional exports, is reduced;
- service and knowledge-based industries which often underpin urban economies, are affected by the impact of congestion on labour productivity and on city 'liveability' influencing the attraction of a skilled workforce;
- productivity of urban transport infrastructure in moving people, freight and delivering services is constrained;
- performance of non-urban networks and modal competition is affected. For example, where passengers and freight share the urban rail network, priority is generally accorded to passenger services. While this may reduce congestion pressures on urban roads, it can also affect the performance of inter-regional rail freight transiting urban areas; and
- fuel is wasted and emissions exacerbated by time spent in congested and stop-start travel conditions with negative long-term consequences for climate change.

While the increase in forecast costs is potentially avoidable through effective interventions, these carry their own costs. In order for government interventions to deliver the best congestion outcomes and be cost effective, it is essential that they be based on objective, rigorous analysis of their operational, financial, economic, social and environmental impacts. Rigorous analysis depends on relevant and accurate information. However, many decisions relating to alleviation of congestion costs - by policy makers, operators and users - are currently made with inadequate information.

The requirement for good information takes on even greater importance in major urban areas. Here the costs of interventions can be very high, especially for new and upgraded infrastructure. Complex urban interactions make estimating the costs and impacts of alternative transport options even more difficult, especially when most congestion interventions involve a number of complementary measures, integrated as a package.

3) What are the Weaknesses in Congestion Information Currently Available to Decision-Makers?

Transport and planning agencies across Australia were surveyed to identify if, and where, they believed there were significant information gaps that impeded decision-makers from implementing the best solutions to managing urban congestion. These were provided as an initial scan of the important issues. Further analysis is currently underway and is outlined in Section (5). A summary of the important gaps identified from the survey follows.

- In terms of performance of the urban road network, several current projects by Austroads (the organisation of Australian and New Zealand road transport and traffic authorities), once implemented, would provide substantial performance information on a nationally consistent basis. The new National Performance Indicators will ensure that sufficient data are collected to assess the performance of the urban road network (especially the most congested and vital sections) through a number of core indicators. However, the data collected is not disaggregated to different user groups, eg car, freight and public transport. The latter is important in better understanding the impact of congestion on specific users of specific routes and, in turn, on their travel choice decisions. Further work underway by Austroads could assist in this area - see Section (5) for further details.

- There is a lack of consistent performance measurement within and across modes. This means that comparisons of the performance of different modes under congested conditions, or of alternative modal interventions, using existing performance indicators, may be misleading. Also, modal inconsistencies impede analysis of the interrelationships and interdependencies across modes, which are part and parcel of complex urban areas. Additionally, urban transport activity levels, which are crucial in understanding congestion, are not consistently or comprehensively reported.

- There is a lack of consistent multi-modal indicators. These are becoming increasingly important in urban areas to support policies introduced to shift some segments of private road-based passenger and road freight movements onto other modes. For example, consistent indicators of origin/destination whole-of-journey travel time involving alternative options, including multi-modal options (eg car, park and ride and public transport segments) are vital in assessing the effectiveness of measures to contain car travel. Development of approaches to improve modal integration would be facilitated by accurate multi-modal indicators.

- There is limited information on the rail sector, eg there is a lack of performance information available to assess the impact of urban rail network congestion on freight movements. As a number of jurisdictions are promoting greater use of rail to carry freight transiting urban areas, eg to/from ports and depots, it is important that information is available to support these decisions, including infrastructure planning and management interventions that can achieve the desired outcomes.

- While considerable performance information for public transport is collected, the performance measures for each sector (eg bus, tram, rail) and operator tend to be discrete and piecemeal. There is no consistent approach to measuring public transport performance.

- There is a lack of information and understanding of transport movements generated by business. It is important to better understand business sector movements including freight, services (such as repair and maintenance services) and people travelling on business (such as between meetings), because this sector creates economic wealth. Congestion can impact all elements of business sector movements, adversely affecting growth.

- There are limited before and after assessments of congestion management measures. These assessments are essential if we are to ensure that interventions deliver their expected outcomes, and also continue to refine and improve modelling and forecasting to help develop effective and well-targeted interventions.

The main conclusion to be drawn from this survey is that targeted action is necessary to equip decision-makers with better information in order to meet the complex challenges generated by urban congestion pressures. In particular, the past development of discrete and inconsistent performance measures for each mode flies in the face of decision-makers' need for comparable performance information across urban modes and systems, and must be remedied.

There are initiatives underway by individual jurisdictions or modal groups to improve the collection and use of congestion-related information. Some of the more important initiatives are outlined in the Attachment. These initiatives are being built upon under the COAG decision in a structured way. More intensive examination and evaluation of selected existing and emerging interventions would provide lessons about factors contributing to high value outcomes, to improve performance measurement and modelling, and uses of new technology to facilitate data collection.

4) Key Principles for an Approach to Improve Information for Urban Congestion Decision-Making

This section proposes several key principles to improving urban congestion information. Arrangements to improve information should embody these principles.

Needs-Driven

Figure 2 illustrates that data/information/indicators are essential to all elements of the decision-making process: understanding the issue; problem identification; analysis of options and impacts; and ex-post evaluation. Further, as new information is generated as a result of the assessment activity, models can be refined along with performance indicators to provide better insights on options to manage congestion.

Urban congestion information systems and modelling capability, for all elements of the decision-making process, should be driven by the overriding strategic need for policy-makers to develop better interventions to tackle rising congestion pressures. This objective should be translated into specific operational objectives (such as for road or land use management) which drive particular information and modelling needs, including meeting user needs (such as real-time travel time information for travellers). In turn, these information systems should drive data requirements and collections.

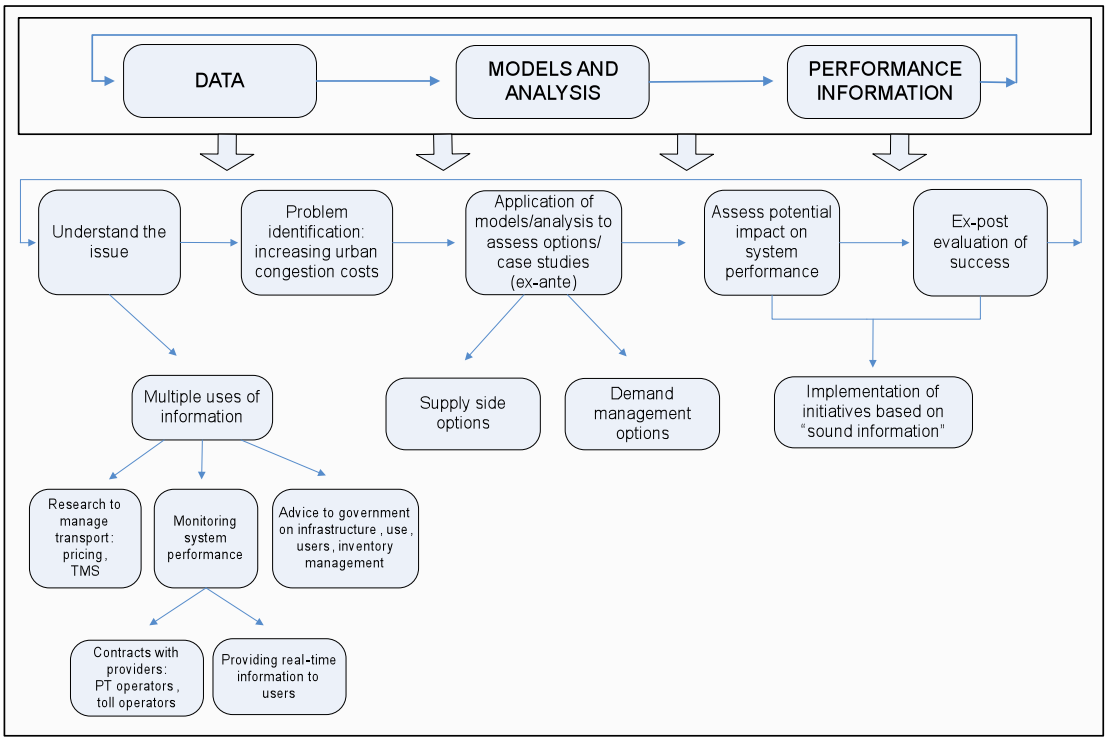

Figure 2: Elements and Uses of Information to Support Transport Decision-Making

Consistency and Comparability

Many of the concerns raised by jurisdictions relate to a lack of consistency in performance information. Consistency and comparability of performance information within and across urban modes is a foundation requirement for better congestion decision-making. Unless decision-makers have information that allows them to 'compare apples with apples' then they will not be in a position to determine the best solutions which maximise benefits of interventions and achieve value for money. Data collected to support comparable performance measures are generally of greater value than ad hoc collections because they can be used to develop more value-adding performance measures over time, such as whole-of-journey multi-modal indicators. If base indicators are consistent, it is possible to build on them. Progress in improving urban congestion performance information can then be made incrementally, building from partial to higher value-added analysis.

Comparability of indicators/measures also helps each jurisdiction place their congestion levels and congestion interventions within the broader context of Australian experience. National consistency in performance information would also support other national interventions. For example, *Infrastructure Australia* has the task of conducting audits and developing a priority list of nationally significant infrastructure, including for transport.[4] Consistent performance information would be a valuable tool in this exercise, as it underpins a consistent approach to assessing urban transport priorities on a national basis. Additionally, the COAG-endorsed 'National Guidelines for Transport System Management in Australia,' provide a framework for identifying and assessing initiatives to improve transport efficiency. The Guidelines include an approach for undertaking benefit-cost analysis of urban transport initiatives, including public transport. The Guidelines cover infrastructure and non-infrastructure options in the assessment process, and summarize data requirements necessary for such analyses. The Guidelines emphasize the importance of setting objectives, targets and indicators to assist with transport planning - indicators provide the mechanism to monitor system performance against objectives and targets.

Evolution from Partial to Systems-Wide Analysis

The importance of developing consistent performance information within and across modes is a microcosm of the broader concern in transport policy to look beyond individual modes to the transport system as a whole. Inconsistency of performance measures is a product of the separate development, operation and management of modes and their information systems over time. Such an approach is inadequate in complex urban areas, where alternative modal solutions, modal interactions and interdependencies, are fundamental characteristics of the network that need to be modelled, examined, assessed and managed.

It is the performance of the entire transport network which should be reported. While developing indicators relevant to only parts of network activity may have limited application, to attempt whole-of-network analysis is extremely complex, and is currently the subject of considerable review around the world. For the purpose of developing a set of feasible indicators for improved urban congestion management, it is better to focus initially on a more limited but manageable set of activities and build additional capability over time. This incremental or evolutionary approach is only possible as long as the building blocks are consistent and comparable.

An approach to achieve this is depicted in Figure 3. It focuses on delivering early benefits that are readily achievable by reinforcing existing initiatives, as well as commencing developmental work that builds on these initiatives to deliver medium and long-term gains, focusing on priority needs. Each stage builds on the former to add further capability and help complete the jigsaw.

[4] 'Rudd Government to Dramatically Overhaul National Infrastructure Policy,' joint media statement by the Prime Minister and Minister for Infrastructure, Transport, Regional Development and Local Government, Canberra, 21 January 2008.

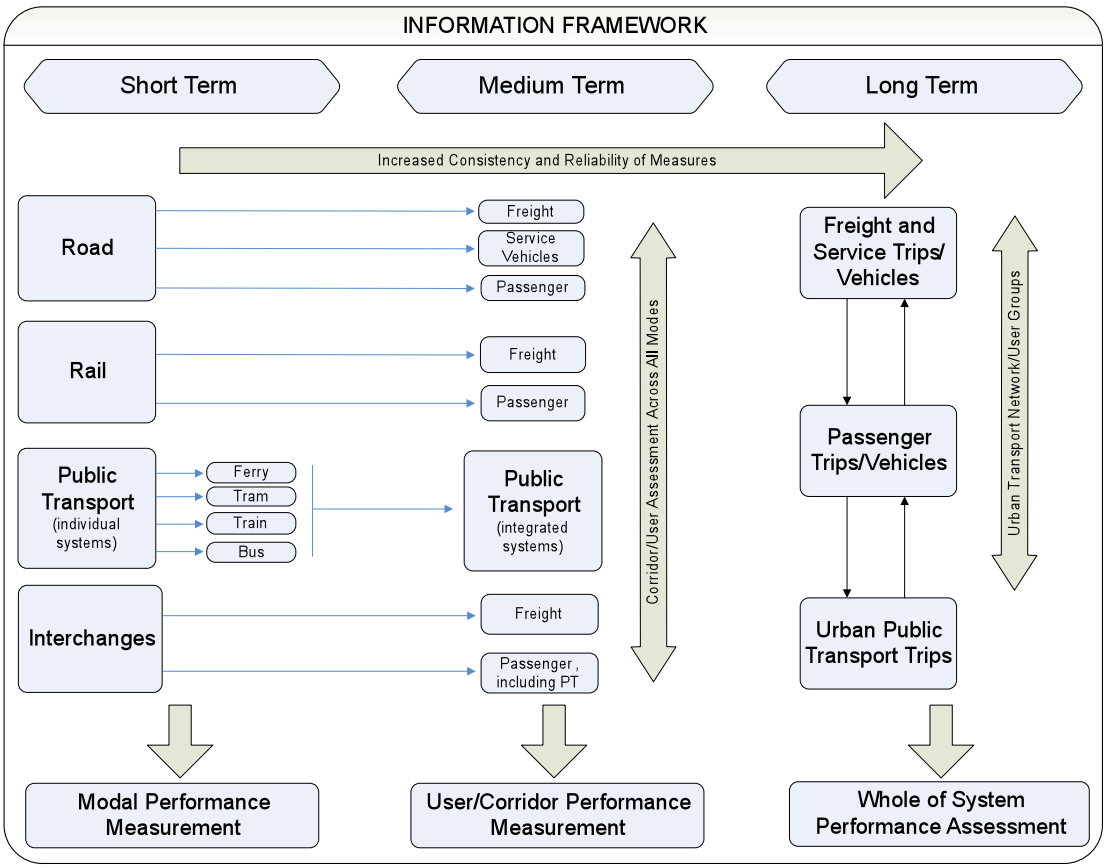

Figure 3: Development of an Information Framework for Improved Decision-Making on Urban Congestion

Although the roads sector is the most advanced with its information framework, there are still gaps that need to be addressed to understand performance of the components of the traffic stream, eg cars, buses, trucks. Public transport indicators exist on a piecemeal basis, as they have been developed to serve a variety of purposes (eg in some cases they form the basis of contractual arrangements with private suppliers of bus services). There appears to be limited information on a trip basis involving more than one mode or corridor-based activities (eg reliability of connections at public transport interchanges for whole-of-journey analysis). As the set of indicators is developed over time and a consistent approach is used to measure performance across modes and across sectors, there is scope to develop a more comprehensive and reliable understanding of the performance of the transport system overall.

The work to date of the UCMWG has more clearly defined the medium term time frame through the identification of a recommended set of core transport and congestion indicators. The next step is to further refine and 'road-test' this set of indicators.

If the objective of improving urban congestion management is to be achieved, the analysis of performance should focus not only on the monitoring and measurement of performance outcomes, but also to those factors that may contribute to lack of performance. This is an iterative process. As the process progresses, understanding of what is most important in identifying factors determining differences in performance will increase, and the focus of attention can be refined.

Data Relevance

Better information, including through performance measures and modelling capability, is reliant on identifying and collecting the appropriate supporting data. This includes data on performance outcomes, eg travel times, vehicles per hour, vehicle loadings (passengers or freight); as well as on underlying inputs that are critical in shaping and producing these outcomes, such as user behavioural characteristics.

There appears to be no consolidated database at the jurisdictional level that could be drawn upon to provide all the data required for meaningful indicators or specification of models. It is

unlikely that improved performance information will require the development of new mega datasets, but rather the plugging of some gaps with the intelligent collection, use and analysis of data through extrapolation and inference, using modelling capability where appropriate, to meet decision-makers' information needs cost-effectively. 'Road-testing' proposed indicators will help identify approaches to cost-effectively provide necessary data, including use of new technology to facilitate data collection.

Complementary Initiatives

The ATC has commissioned a National Transport Data Framework project to initially provide improved traffic movement data and projections, in particular for AusLink non-urban corridors. A proposal to continue cooperation for improved road traffic data and transport modelling, including in urban areas, is currently being developed for consideration by ATC later in 2008.

The Australian Bureau of Statistics is, in consultation with BITRE, states and industry stakeholders, examining opportunities to provide more comprehensive national transport statistics, including by making better use of existing data sets and through use of new technologies.

5) Priorities

Based on the major gaps and limitations identified by the survey of jurisdictions, and the principles considered essential for improving congestion-related information, four strategic priorities have been identified for further analysis and action. This section outlines progress to date with each priority.

- performance indicators of urban systems;
- business sector urban transport movements and growth patterns;
- urban congestion modelling; and
- case studies and modelling-based trials which advance practical understanding of congestion information and good practice interventions.

Ultimately, benefits to be gained from each issue would be maximised through an integrated approach for improving information for urban congestion decision-making.

Performance Indicators of Urban Systems

Achieving consistency within and between key modal performance measures/indicators is the foundation for improving urban congestion information systems. Consistent indicators across modes, which capture the main impacts of congestion and congestion interventions, are essential supports in assessing alternative interventions and monitoring the effects of interventions.

A sound start to this process has been made by jurisdictions working through Austroads in developing the new National Performance Indicators for the urban road network. These include three categories of performance indicator to measure the impacts of congestion - efficiency, reliability and productivity. For example, efficiency is measured by travel speed and variation from posted speeds. Reliability is measured by variability of speeds. Productivity is measured by the product of speed and traffic flow. Figure 4 illustrates the type of easily accessible management information available from the National Performance Indicator programme. The example indicates that about 56 % of the network is operating at a speed that is within 30% of the posted speeds. These indicators will be based generally on real-time data collected from traffic control systems to provide nationally consistent measures of road network performance.

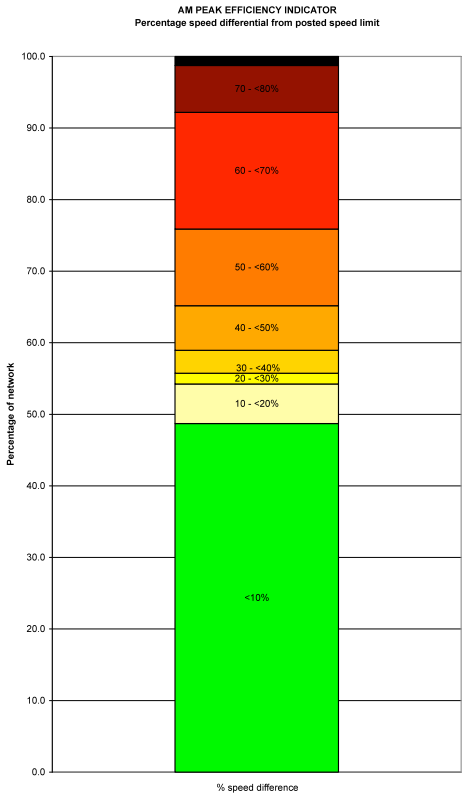

Figure 4: Road National Performance Indicators: Efficiency Indicator

Another Austroads project is evaluating the application of new axle recognition technologies and loop detector configurations situated in the road. These technologies provide the possibility of identifying the classification of passing vehicles and whether a freight vehicle is running loaded or not. This work has the potential to enable performance measures to be further disaggregated between cars, light commercial, heavy commercial and articulated vehicles. This would significantly enhance the ability of decision-makers to understand vehicle movements and the impacts of congestion and any interventions on these different users.

A study was commissioned from Troutbeck and Associates and Kittelson and Associates to build on the Austroads work to identify a small set of core indicators relevant to providers and users that were consistent across modes, under the following headline categories; efficiency, reliability, productivity, and social and environmental performance.

Measurement for each indicator is based on the following:

- Efficiency: Efficiency of the system as seen by the user is measured by travel times with respect to a benchmark.
- Reliability: Reliability is measured by the expected variation in the efficiency measure as seen by the user making the same trip on similar days.
- Productivity: Productivity or throughput, is measured by the product of the quantity (volume) and quality (speed) of flow. A system with high productivity provides a high quality of service (indicated by higher travel speeds) to a larger number of people or goods.
- Social: Social performance is measured by various indicators, such as travel time by mode by spatial demographic group and is closely linked with accessibility.
- Environmental: Environmental performance is measured by fuel consumption and Greenhouse Gas emissions by mode by average number of stops and the total duration of stops on a journey.

Such indicators will facilitate comparisons of the performance of different modes under congested conditions and the benefits of alternative modal options when addressing particular congestion problems. The consultancy also made a start at addressing major methodological issues involved in adopting consistent indicators, including identifying any required proxy indicators, relevant datasets and their ease of collection.

The next step is to further refine and 'road-test' this set of indicators to identify important conceptual, methodological and data availability issues involved in possible implementation, including cost-effectiveness. Issues involved with development of whole-of-journey indicators, including multi-modal indicators, will also be examined. 'Road-testing' will need to involve a number of agencies across all relevant urban modes. The outcomes will provide jurisdictions with practical information to assist them in their consideration of future action.

Business Sector Urban Transport Movements and Growth Patterns

The impact of congestion on urban economies and the broader Australian economy is an economic and transport issue of great significance. Information gathering and analysis has tended to focus on freight, which although a vital issue warranting further work, is not the only component of the broader business (ie non-private) transport sector. Further work is needed to improve performance information and modelling capability on the business sector as a whole in urban areas for the following main reasons.

- The business sector not only includes freight but also the growing volume of 'service' movements in urban areas (eg residential and commercial maintenance and repair services) and business-related passenger movements. These three components are interdependent, all wealth-generating[5] and vulnerable to the impacts of congestion.

- The growing service orientation of the economy, and especially urban economies, is likely to be fuelling much of the growth in urban transport movements. (Transport is, of course, itself a service industry). There is a strong emerging view that we need to understand the services sector more because of its substantial economic importance. A recent House of Representatives Inquiry report commented that the services sector accounts for 'around 75 per cent of output and 85 per cent of employment'.[6] The Business Council of Australia published a report in 2007 on Australia's service sector, commenting that it is 'time to better recognise that our economic success and prosperity are increasingly linked to the performance of our services sector'.[7] In transport policy, it is important to better understand the relationship between service sector growth and its transport implications, in order to be able to devise better strategies to minimise the impact of congestion on service sector expansion.

- Light commercial vehicle (LCV) transport movements in capital cities are forecast to grow rapidly, impacting on overall traffic levels and congestion.[8] As growth in these movements is most strongly generated by business sector movements (freight distribution and 'service' movements), it is important to better understand the relationship between LCVs and congestion.

[5] Service movements are both directly and indirectly wealth creating. For example, many service movements are business-to-business (such as maintenance and repair of industrial and commercial facilities, and servicing of economic infrastructure including energy, telecommunications, transport and water). These movements are an integral element in maintaining and improving productivity of all sectors of the economy.

[6] 'Servicing our future: Inquiry into the current and future directions of Australia's services export sector,' House of Representatives Standing Committee on Economics, Finance and Public Administration, Commonwealth of Australia, Canberra, May 2007, piii.

[7] 'Underserviced: Why Australia's Service Economy Deserves More Attention,' Discussion Paper, Business Council of Australia, July 2007, p2.

[8] LCVs are defined by the ABS as, 'motor vehicles constructed for the carriage of goods and which are less than or equal to 3.5 tonnes GVM. Included are utilities, panel vans, cab-chassis and goods carrying vans (whether four-wheel drive or not)' (ABS 2007a: p 43). LCVs comprise a substantial and rapidly growing segment of the urban traffic stream, with forecast vehicle kilometres travelled (VKT) growth of 90%, 2005-20, leading to LCVs comprising an expected 19% of total urban traffic by 2020 (second only to cars) (BTRE, Working paper 71, p67).

- It is problematic whether 'service' movements are properly defined by the traditional dichotomy of transport movements into passenger and freight movements. A defining characteristic of 'service' movements appears to be that the vehicle driver delivers a service at particular destinations using tools of the trade carried in the vehicle, eg maintenance and repairs. The driver of such a vehicle does not generally deliver freight (although the Australian Bureau of Statistics Survey of Motor Vehicle Use classifies 'tools of the trade' carried in LCVs as freight).

The opportunity should be taken to test use of emerging technologies to assist in identifying, collecting and analysing information about business-related transport. A pilot should be undertaken into use of Automated Number Plate Recognition (ANPR) technology to identify the volume of business-registered vehicles on particular corridors, as well as times of travel, and type of business. This would greatly assist our understanding of what business-related transport is, how it functions in Australian cities, and how congestion impacts the sector. The pilot would cover technical, data-gathering and confidentiality issues.

Urban Transport Modelling

In order to maximise the value of urban transport modelling as a tool in improving urban congestion interventions a National Workshop on Urban Transport Modelling was held in Canberra on 5 March 2008. It was co-convened by the Urban Congestion Management Working Group and the Bureau of Infrastructure, Transport and Regional Economics. The workshop brought together nearly 60 participants, including urban transport modellers, decision-makers, research bodies and transport and planning agencies.

One of the outcomes of the workshop was to recognise that modelling is capable of informing urban congestion management interventions but that currently policy and modelling are not well coordinated. Improvements need to be made for policy makers and modellers to work collaboratively in framing appropriate urban congestion management questions. The socio-economic impact of urban congestion interventions, for example, is an area which needs to be better modelled and understood.

The following five key areas summarise the proposed areas which received most support for further action.

1) Time of travel and behaviour shifts (i.e. how people make decisions) are not adequately modelled.
New models need to be developed for peak spreading/time of day choice. Current models often exaggerate modal shift (in response to road capacity being reached), compared to changing time of travel. In contrast public transport is generally modelled with no capacity constraint - at variance with what is often the actual situation.

2) Socio-economic impacts of various interventions are not modelled to an adequate level.
An example of such impacts would include the distributional impacts of road pricing on different socio-economic groups; willingness to pay; ability to pay and access to alternatives, need to be captured.

3) Reliability modelling
Better modelling is needed to assess the role reliability plays in mode choice and how reliability affects patronage, compared to other aspects of travel choice.

4) Freight/Light Commercial Vehicles
A cost-effective way of obtaining data for freight and business sector transport modelling needs to be identified. The establishment of a Freight Movement Working Group to develop and implement a better data framework for freight and business sector transport was proposed. In identifying the most appropriate action to progress this issue, it will be important to ensure there is no duplication with the current Austroads Freight Program and the work of the SCOT/BITRE data sharing project steering committee.

5) Collaboration to improve methodologies

To date there has been a lack of communication and collaboration between agencies, academics and decision makers and this makes maximising the uses of modelling for a national urban congestion strategy difficult. Informal networks need to be strengthened and 'best Australian practice' needs to be documented. A clearing house for modelling resources needs to be established.

One option to improve collaboration and communication would be to establish and resource a national urban modelling coordinating capability. Policy and modelling objectives could be better coordinated and areas needing most urgent action could be more easily identified. Key roles of the modelling capability would be: undertaking stocktakes of existing approaches, their strengths and limitations; developing best practice guidelines; encouraging knowledge sharing; and identifying data needs and strategies to address them. This possible approach needs to be considered in greater detail.

Trials and Case Studies

Developing an effective approach to improving urban congestion information in Australia involves:

- ensuring stakeholders representing different modes, agencies and jurisdictions have 'buy-in' to new consistent modal indicators;
- testing new concepts in practical ways;
- identifying availability of necessary data or alternatives to collecting new data;
- examining other methodological and implementation issues relating to possible uptake of new indicators;
- testing the potential of new technology to collect/analyse data; and
- testing potentially high value interventions, including to improve the information base on factors contributing to good performance.

There are many real-world examples within Australia of innovative improvements to congestion-related management and user information, often as integral components of practical congestion interventions. A number of these initiatives are outlined in the Attachment. There would be value in building on these case studies by evaluating a range of current and emerging congestion-related initiatives and publishing the results.

Conclusion - Next Steps

At its meeting on 29 February 2008, ATC agreed to a new national approach to transport policy. Ministers agreed that individual Ministers from the Commonwealth, States and Territories will take responsibility for developing aspects of a national transport policy. One of the streams of work is urban congestion, which is being led by Victoria's Ministers for Roads and Ports, and for Public Transport. Subsequently, at its meeting on 2 May 2008, ATC agreed to include the further progression of the measures proposed in this report in its work plan for the urban congestion component of a new national transport policy.

Recommendation: That COAG:

1) NOTES progress to date towards developing a national approach to improve information for urban congestion decision-making and that the Australian Transport Council will build on this progress through development of the urban congestion element of a new National Transport Policy.

CASE STUDIES AND A SAMPLE OF CURRENT INITIATIVES BY JURISDICTIONS

- **Automated Number Plate Recognition (ANPR) Technology and Business-Related Transport:** Domestically and internationally, ANPR technology is currently being used for traffic safety initiatives and law enforcement. The Queensland Department of Main Roads currently utilises ANPR technology to monitor heavy vehicle movements and enforce access restrictions on the Brisbane Urban Corridor. The UCMWG in collaboration with the Queensland Department of Main Roads are testing the feasibility of using ANPR technology to assist in improving understanding of business-related transport. Initially, this will entail a small-scale feasibility exercise with the aim of identifying the overall break-down of aggregate share of business and personal travel on a section of the network. Collecting and analysing information about business-related transport through ANPR technology, and the overall analysis of movements, will help identify the volume and proportion of business-registered vehicles on particular corridors, as well as times of travel and the general category of business. This would greatly assist our understanding of what business-related transport is and how it functions in Australian cities. An expanded case study, including a number of jurisdictions, would help assess the technical and confidentiality feasibility issues of using ANPR technology for this purpose. Commonwealth, State and Territory jurisdictional privacy laws and principles will be adhered to through the establishment of a clear project statement of intent, objective, data security arrangements and reporting at an aggregate, not individual level.

- **TravelSmart - Brisbane North Pilot:** As part of the Queensland TravelSmart programme, the Brisbane North project used individualised marketing techniques to encourage people to reduce private vehicle travel in favour of shorter trips and more sustainable modes of walking, cycling, car pooling and public transport. Some 70, 000 households were involved, making this the largest project of its kind to be conducted in the world. A 'before and after' assessment of the pilot was undertaken (March 2006 and March 2007 respectively). Main results are summarised in the table below.

Mode shift

Number of House-holds	VKT reduction	Car mode share (driver)	Relative % increase in public transport mode share	Relative % increase in cycle mode share	Relative % increase in walk mode share	Relative % reduction in km travelled per year
70,000	13.2%	-13%	22%	58%	49%	-13%

There was a reduction of 3.1 kilometres per car per day in the Brisbane North project area. This change amounts to a reduction of 114 million car kilometres per year (a 13% relative reduction) for the target population. Overall, the combined modal share of walking, cycling and public transport increased from 17% to 24%, and that of the car and other motorised private modes decreased from 83% to 76%. The analysis showed that small individual changes in travel behaviour resulted in significant aggregate effects. The greatest relative reduction in car trips occurred between 3pm and 7pm (30% to 24%) followed by 9am to 3pm (40% to 34%) with associated benefits in managing congestion. TravelSmart projects reduce car use and subsequent fuel consumption. For example, a saving of 114 million vehicle kilometres travelled equates to approximately 11 million litres of fuel. The reduction in vehicle kilometres travelled equates to a reduction of 31,900 tonnes of CO2 emissions per year (as measured by European Union standards).

The assessment highlighted that the benefits of the North Brisbane project exceed the costs (in present value terms) by a factor of 36:1. This figure includes the purchase of additional buses and trains to accommodate the additional public transport passengers. Sensitivity tests indicate a range from 24:1 to 50:1

- **Riverside Expressway Transport Investigation and Network Analysis, Brisbane:** The Riverside Expressway was closed 17-20 October 2006, due to a structural problem. During this period the Gateway Bridge toll was waived and bus and transit lanes were opened to single occupancy vehicles. The opportunity was taken by Queensland to examine the impact of the closure and associated changes on congestion levels and travel behaviour change, including public transport usage, across a broad cross-section of the major corridors in Greater Brisbane. The examination also assessed relevant agencies' incident management during the closure. The examination is close to finalisation and its results would provide a useful case study into the travel behaviour and congestion consequences of modifying urban road conditions.

- **Use of Performance Information to Improve Service on Sydney's Strategic Bus Corridors:** The NSW Ministry of Transport and Roads and Traffic Authority are working together to deliver integrated value-for-money solutions to support efficient public transport services on Sydney's strategic bus corridors. This is aimed at increasing the mode split of public transport and improving the efficiency of the Sydney road network by making buses more attractive through increased reliability, punctuality and passenger throughput. The 43 bus priority corridors identified in the 2003 Review of Bus Services across Sydney are currently being investigated for technology and physical infrastructure investment. PTIPS (Public Transport Information and Priority System) will be the primary source of data for the performance measures. PTIPS is currently being rolled out on two trial corridors. Innovative electronic bus priority measures will be installed along with bus priority infrastructure.

  PTIPS is able to:

  - track buses via satellite and measure their position against the particular bus/route timetable. It is then able to communicate with SCATS (Sydney Coordinated Adaptive Traffic System) to give late running buses green signals where possible;
  - give real time passenger information, which will be provided initially at test sites on the northern beaches and the Liverpool to Parramatta Transitway;
  - aim to improve the on-time running of buses, thereby improving the attractiveness of bus travel as an alterative form of transport to private vehicles; and
  - enable the Ministry of Transport to track bus service performance as per Metropolitan Bus Service Contracts.

  A number of potential performance measures have been identified:

  - reliability (the standard deviation of trip starts and finish times in relation to their scheduled start and finish times);
  - punctuality or 'run time' (incremental and accumulative);
  - patronage;
  - frequency (number of vehicles past a point);
  - throughput (number of passengers conveyed past a known point);
  - number of priority calls by buses to the PTIPS system and the percentage of priority calls granted; and
  - wait time at bus stops in busy areas.

  PTIPS is being installed on all Sydney, Newcastle, Wollongong and Central Coast public transport buses between now and June 2011. It will eventually be installed on 4000 buses (both the state and private bus fleet in these areas). Victoria, Perth, Singapore and the RTA's SCATS distributor have expressed strong interest in utilising PTIPS.

- **Liverpool-Parramatta Bus Transitway (Sydney):** Opened in 2003, the Liverpool to Parramatta Transitway (LPT), a dedicated busway, has since carried over 8.8 million passengers. The LPT is 31km in length with 33 stations between its major centre destinations. It has 20kms of purpose built off-road bus lanes and 11kms of dedicated

space on existing roads. The infrastructure cost was $350m. The LPT connects with North-West T-way at Parramatta and the developing Strategic Bus Corridor of Blacktown-Parramatta via the Great Western Highway. The LPT has the following features:

- dedicated bus-only roadways or bus lanes where the alignment uses existing or planned roads;
- high quality stations placed at 800m intervals providing shelter, lighting, passenger security, information and bicycle parking;
- intelligent transport systems that provide priority for buses through signalised intersections, running time information for passengers and unauthorised vehicle detection;
- low floor, accessible and air conditioned buses that run at regular intervals throughout the day and much of the night; and
- shared cycleway/walkways along the length of the T-way that are lit and connected to local footpaths.

Bus services have been built up from initial operations to an extent where timetabled services are now at 8 minute frequencies in peak hours and 15 minutes out of peak. In 2004 a passenger survey calculated that 13% of trips were replacing car trips. If this rate is similar today, based on current ridership levels, over 800 car trips a day, or 5,800 a week, are saved.

The initial longer term planning intentions included reforming bus service in areas historically poorly served, bringing about land use changes along the corridor and the provision of a state of the art infrastructure facility. The LPT has given councils increased opportunity in terms of land that can be developed for residential purposes with good levels of public transport accessibility. The LPT is a means of absorbing growth in a more sustainable manner. Local government can play a major role in the creation of opportunities for public transport and consequently sustainable urban planning. Working collaboratively and creatively through the issues and constraints, it is possible to resolve suitable implementation mechanisms. The on-going process of urban expansion and renewal provides a golden opportunity to steer the statutory planning process, through development control plans, precinct plans and approval conditions, to delivering real improvements.

- **Melbourne's Freight Movement Model (FMM):** The Victorian Department of Infrastructure has recently developed a practical and operational freight movement modelling and forecasting capacity - the Freight Movement Model (FMM) - to assist the strategic planning of freight movements as a component of the total metropolitan Melbourne travel task. The development of, and integration of, the FMM with the model of personal travel - Melbourne Integrated Transport Model - (MITM) now provides the Department of Infrastructure with an understanding of the quantum and coverage of the existing metropolitan freight task and the capability to assess and develop policy initiatives to improve both personal travel and freight movement across metropolitan Melbourne. The FMM has been subsequently used in Sydney, Adelaide, Brisbane and Perth. At each stage, refinements have been made and incorporated back into the model.

- **Perth's New Southern Suburbs (Mandurah) Rail Line:** The new 73 km line opened at the end of 2007. Much of the new line has been built in the centre of the existing Kwinana Freeway, so potential modal transfers from road to rail and direct congestion impacts in the corridor will be more easily measured. Additionally, the relevant agencies are planning to undertake a rigorous 'before and after' assessment of the impacts of the new line. This analysis would also allow assessment of the accuracy of project modelling and assumptions and provide useful lessons for future project appraisal methodology.

- **Optimisation of Traffic Signal Coordination in Adelaide:** The vast majority of road travel in Metropolitan Adelaide occurs on urban arterial roads generally laid out in a grid pattern with a few major radial routes. The dominant method of traffic control is intersection traffic signals; all managed using SCATS, rolled out during the 1980s and early 1990s. A programme to review SCATS operations to ensure traffic signal coordination is better aligned with a road's strategic importance commenced in 2002 with the objective of improving travel times, recognising that many of the SCATS settings were dated. Results to date are approximate but suggest some sizeable improvements in travel times (5-30%) and useful associated emission savings (1-5%).